

Biodiesel

*Exciting Business and Workforce
Opportunities for an Emerging Industry*

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Biodiesel Basics

- ▶ Biodiesel is a diesel-equivalent fuel produced from biological sources (biomass)
- ▶ Produced through a catalyst-based reaction (transesterification) of oils and fats, resulting in methyl esters (biodiesel) and a glycerin by-product



Biodiesel Basics

- ▶ Renewable fuel, biodegradable, non-toxic and cleans engines
- ▶ Typically blended with petroleum-based diesel to be used in conventional diesel engines
 - ▶ Blend rates of 2-20% biodiesel with 80-98% petroleum diesel are most common (B2 = 2% biodiesel blend / B20 = 20% biodiesel blend)



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Biodiesel Market

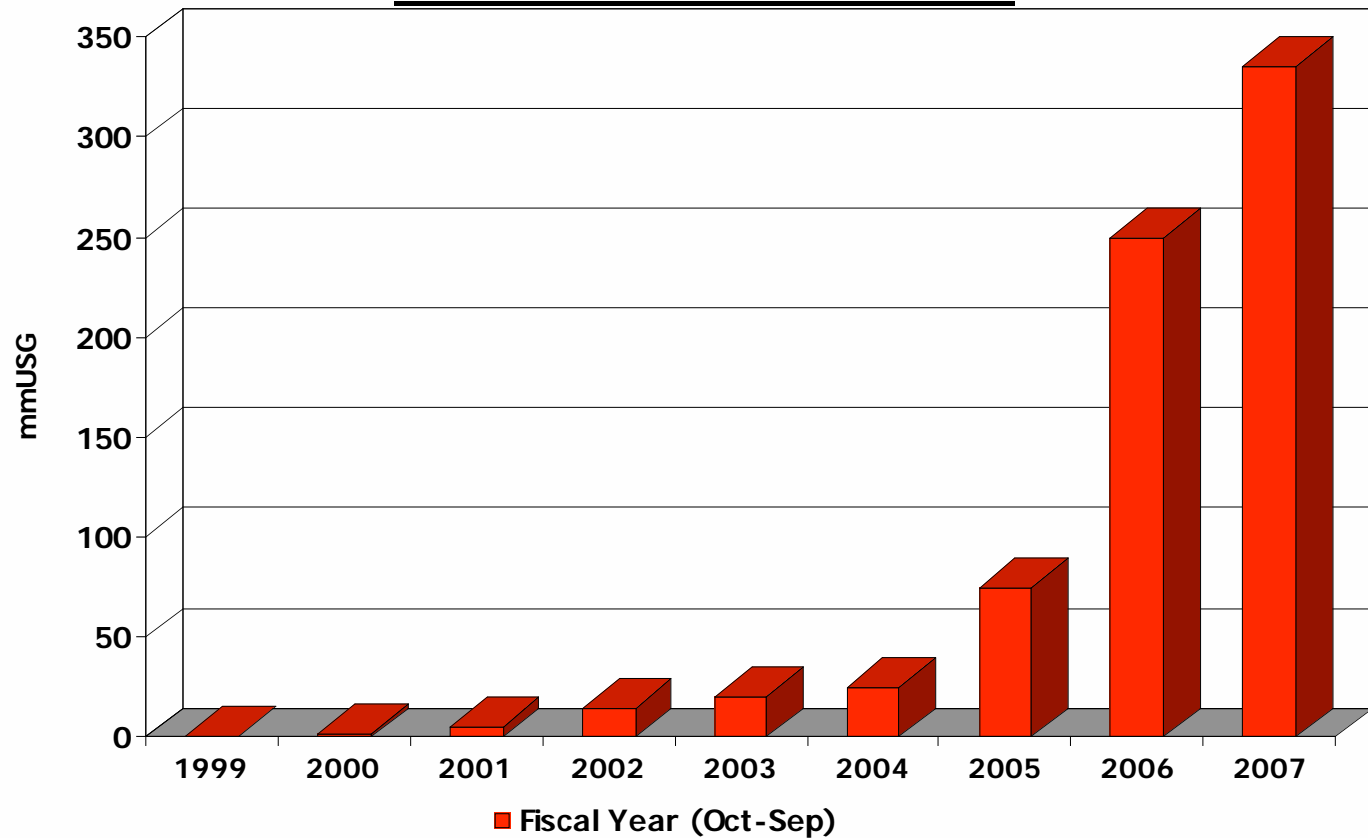
- ▶ Explosive growth since 2004
- ▶ Currently 171 plant sites in North America with 60 new plants under construction or expanding
- ▶ Growing from a cottage industry to a recognized renewable motor fuel



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Biodiesel Market

Estimated Biodiesel Production



Source: National Biodiesel Board

Scope

▶ Oil Industry

- ▶ USA consumption per year:
 - ▶ 233 billion USG of crude oil (imports = 90%)
 - ▶ 52 billion USG of diesel fuel
- ▶ Global consumption per year:
 - ▶ 1,200 billion USG of crude oil
 - ▶ 345 billion USG of distillates

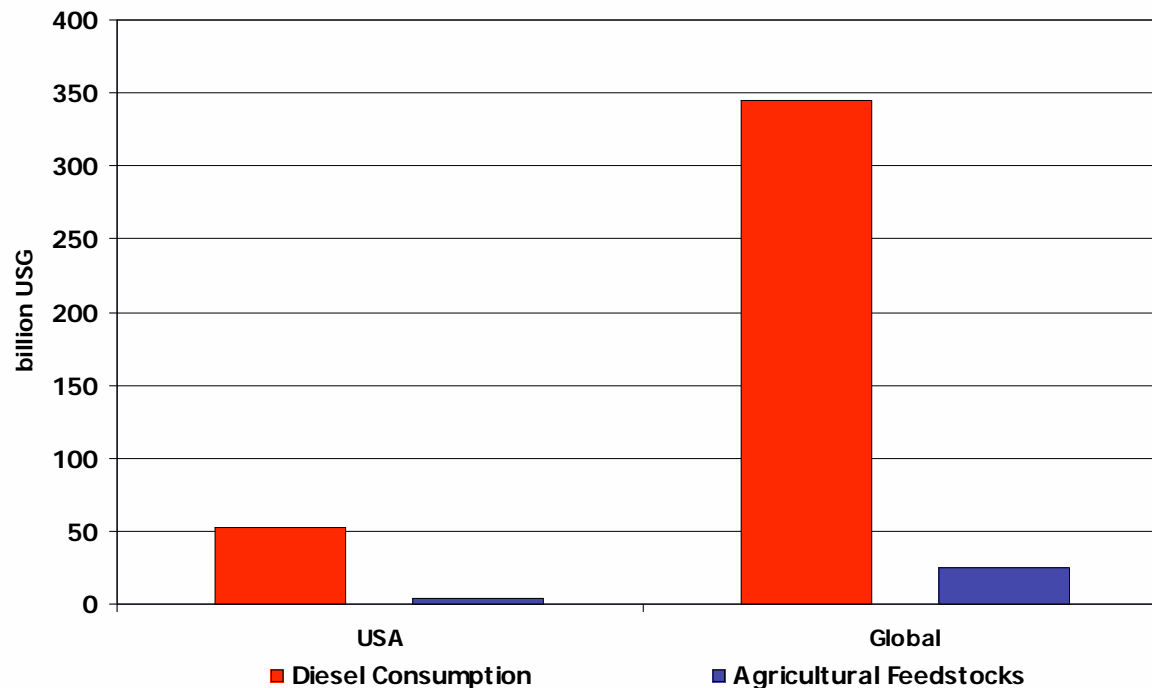
▶ Agricultural-based Feedstock

- ▶ USA production per year:
 - ▶ 3.4 billion USG of major vegetable oils
 - ▶ 1.4 billion USG of fats (animal & grease)
- ▶ Global production per year:
 - ▶ 32 billion USG of major vegetable oils
 - ▶ 3 billion USG of fats (animal & grease)



Scope

- ▶ *The oilseed and fat market is only a small fraction of the oil industry*
- ▶ If all feedstock was converted to petroleum replacements, only 8% of domestic and 10% of global diesel consumption could be substituted, however, the entire world would go hungry



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- ▶ Providing Environmental Solutions and Added Value for the Agri-Food Industry
 - ▶ **Rendering**
 - ▶ Transformation of animal by-products into high quality fats and proteins
 - ▶ **Restaurant Services**
 - ▶ Professional collection of used cooking oil and grease
 - ▶ **Agri-food Trading**
 - ▶ Trading of agricultural commodities including fats and oils
 - ▶ **Hides, Skins and Leather**
 - ▶ Preparation of hides and skins for leather production
 - ▶ **Energy**
 - ▶ Biodiesel production, new feedstock developments and technology commercialization



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▶ Our Vision

- ▶ Borderless, Values Driven and Committed to Successful Growth

▶ Our Values

- ▶ Do What's Right
- ▶ We Care
- ▶ Seek Better Ways
- ▶ Innovate!
- ▶ Take Action & Be Accountable



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- ▶ Operate a 20 million USG multi-feedstock biodiesel refinery in Madison, WI
- ▶ Market biodiesel high-quality biodiesel through marketing partnerships:
 - ▶ Best Biodiesel in Cashton, WI (10 million USG facility)
- ▶ Produce high-quality glycerin and refine crude glycerin sourced from the market for added value to operations
- ▶ Control feedstock supply



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- ▶ Energy risk management services
- ▶ Landfill electricity generation projects
- ▶ New Technology Commercialization
 - ▶ Extraction of oils from by-product or co-products
 - ▶ “Renewable Refinery” - production of renewable, high quality fuel (renewable diesel) and solvent replacements



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Business Opportunities

- ▶ Biodiesel refining spans two different commodity markets
 - ▶ Agriculture & Energy
- ▶ Agriculture markets determine feedstock prices
 - ▶ Soybean oil, canola, animal fats, etc.
- ▶ Energy markets determine biodiesel sale prices
 - ▶ Diesel fuel/Heating oil



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Business Opportunities

- ▶ Feedstock costs comprises 75-80% of production costs
- ▶ The traditional biodiesel business model has disappeared
 - ▶ The price of soybean oil (66¢/lb) is too high to utilize for biodiesel production
- ▶ Alternate feedstocks still offer a positive business model
 - ▶ Animal tallow, palm oil, yellow grease



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Current Feedstock

	Market	Production Properties	Economics	Outlook
Soybean Oil	Large market, yet supplied by only a few goliaths	Simple production, decent cold flow, but poor stability and cetane	On again, off again	Will remain tight to its break-even - not promising
Rendered Materials (BFT, CWG, Poultry)	Small market with only a few suppliers	Requires pre-treatment, but excellent stability and cetane with higher cloud point	Generally good	Use in biodiesel, particularly with "blenders", will continue to increase putting increased pressure on prices
Yellow Grease	Fragmented market with few suppliers	Requires pre-treatment, with a mix of results based on source	Good - with smaller credit	Use in biodiesel will continue to increase putting increased pressure on prices
Palm Oil	Large market with few suppliers	Generally simple production, yet poor cloud point	On again, off again	Global expansion of biodiesel will further pressure prices
Canola Oil	Largely European and Canadian supply	Simple production with excellent cloud point	Poor	Expensive product based on other uses makes it questionable for biodiesel



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Current Feedstock

- ▶ Limited supply
 - ▶ Crop Acreage
 - ▶ Limited increase in land space and product yields
 - ▶ Slow overall growth
 - ▶ Food Industry
 - ▶ Meat and restaurant industry growth limited



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Feedstock Outlook

- ▶ Continued demand growth from the renewable fuels sector
 - ▶ Increasing market growth of renewable fuels
 - ▶ Policy can manipulate prices
 - ▶ Scope of industry is imbalanced
- ▶ Increased impact of energy costs on agricultural commodity prices



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Feedstock Outlook

- ▶ Food vs fuel debate
 - ▶ Not true reality in North America yet, but an emotional issue that can affect policies
- ▶ Price Impacts
 - ▶ Crop price + crush costs (capacity)
 - ▶ Global trade and demand & Currency
 - ▶ Hedge and Index Funds – increased volatility
- ▶ New Feedstocks



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Feedstock Outlook

	Status	Production Properties	Expected Economics	Outlook
Palm Oil	Significant growth in plantings will bring growing supplies	Generally simple production, but poor cloud point	On again, off again	Palm producing countries will try to promote domestic biodiesel production
Corn Oil	Increasing growth, but very limited market with food applications	Requires pre-treatment, but good cold flow	Generally good	Limited availability and biodiesel producers who can utilize it
Jatropha	Strong growth in plantings will bring supply in the coming years	Unknown	Good for vertically integrated companies	Producers at "grass-roots" will hold an advantage based on investment risk
Algae	Product available, but not currently at economical prices	Unknown	Good for vertically integrated companies	Viable product when economics come into line - yet little knowledge

Project Development

- ▶ Planning considerations for a new plant:
 - ▶ Plant size: production efficiency versus logistical challenges
 - ▶ Storage and loading/off-loading efficiency
 - ▶ True multi-feedstock production
 - ▶ Handling and chemical variations among materials
 - ▶ Impurities, moisture and transportation challenges
 - ▶ Effects of changes in feedstock composition in production and final product characteristics



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Workforce Opportunities

- ▶ Biodiesel plants are newly constructed with new job opportunities
- ▶ Sustainable plants with multiple feedstock capabilities operate in complex chemical environment
- ▶ Specialized training, skills and knowledge required: chemistry, mechanical, industrial, computer operations



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Workforce Opportunities

- ▶ New jobs are challenging and exciting
- ▶ Four to six months of training provided for the right candidate
- ▶ Range of positions in operations, maintenance, laboratory, safety, etc



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Workforce Opportunities

- ▶ Job creation grows from new biodiesel plants
- ▶ Estimated that every biodiesel job creates 2.5 additional jobs: logistics, suppliers, etc.
- ▶ Biodiesel has created significant jobs in Wisconsin so far with continued opportunity if State promotes biofuels



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Summary

- ▶ Biodiesel has experienced exponential growth in recent years bringing immense opportunities
- ▶ Feedstock pricing is key to the biodiesel model
- ▶ Multiple feedstock capability and strong supply chain/plant construction is critical
- ▶ Continued strength in feedstock prices will bring new feedstocks in the future



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Summary - Producers

- ▶ Great workforce opportunities in this exciting field
- ▶ New manufacturing plants offer great work environment and benefits
- ▶ Still need State support to promote the use of biofuels to ensure growth



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